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09/401,676	09/22/1999	HENRY ESMOND BUTTERWORTH	UK999-027	4983

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EXAMINER
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LAFORGIA, CHRISTIAN A

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2131

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/401,676  
Filing Date: September 22, 1999  
Appellant(s): BUTTERWORTH ET AL.

**MAILED**

**NOV 27 2006**

**Technology Center 2100**

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Robert W. Griffith  
Reg. No. 48,956  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 18 September 2006 appealing from the Office action mailed 18 November 2005.

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**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**GROUND OF REJECTION NOT ON REVIEW**

The following grounds of rejection have not been withdrawn by the examiner, but they are not under review on appeal because they have not been presented for review in the appellant's brief. The nonstatutory double patenting rejection of claims 12-14 over claims 1-15 of U.S. Patent No. 5,414,858.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

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**(8) Evidence Relied Upon**

5,414,858	HOFFMAN et al.	05-1995
5,933,598	SCALES et al.	08-1999

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,414,858 to Hoffman et al., hereinafter Hoffman, in view of Appellant's Admitted Prior Art, hereinafter AAPA.

As per claims 1, 5, and 10, Hoffman discloses a method for varying between an interrupt service and a polling service (column 2, lines 2-14).

According to page 1 of the Appellant's "Background of the Invention," each hardware device signals that there is work for the software to do by asserting an interrupt line which causes the software flow-of-control to be diverted to an interrupt handler which handles the interrupt. The "Background of the Invention" goes on to state that an interrupt is typically handled by masking (or disabling) the interrupt and scheduling a task for later execution which will service the requesting device. Therefore, since Hoffman discloses the use of an interrupt service, generating an interrupt in response to receipt of a work item, disabling system interrupts, scheduling a task through the generated interrupt for processing of the item, and executing the task to process the work item are disclosed by the Hoffman reference.

Hoffman discloses processing additional work items received by the system (column 2, lines 15-34, i.e. tracking the rates of service requests); and

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when there are no additional work items for processing, speculatively scheduling a further task for processing of subsequently received work items in the system, without enabling system interrupts (column 2, lines 15-34, i.e. when a certain threshold is reached the system switches from interrupt service mode to polling service mode).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to disable interrupts and use a polling system during times of increased usage, since the AAPA states at pages 2 lines 1-14 that using an interrupt service mode when utilization is high is inefficient because of the increased interrupt overhead.

Regarding claims 2, 6, and 11, Hoffman teaches executing the speculatively scheduled task to process any work items received by the system (column 1, lines 33-43, column 2, lines 15-34, column 3, lines 21-51, i.e. polling interrupt lines);

enabling system interrupts when no additional work items have been received by the system when the speculatively scheduled task is executed (column 2, lines 15-34, column 3, lines 39-51, i.e. reverting to interrupt service mode).

As disclosed above, Hoffman and the "Background of the Invention" disclose interrupt processing, thereby disclosing processing one or more work items when at least one work item has been received by the system when the speculatively scheduled task is executed, and speculatively scheduling an additional further task for processing of subsequently received work items after processing the one or more work items, without enabling system interrupts.

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With regards to claims 3 and 7, Hoffman discloses an interrupt system and AAPA discusses that the interrupt is scheduled for later execution, which one of ordinary skill in the art would recognize as being work items managed on a queue.

Regarding claims 4 and 8, AAPA discusses scheduling tasks for later execution, thereby disclosing wherein the event that further work items are received after the task is scheduled and prior to execution of the task, the step of executing the task comprises processing all the received work items.

Regarding claim 9, Hoffman teaches the interrupt generating means and processing means are embodied in a data storage controller and the work items comprise data transfer requests from an attached host system (column 2, line 50 to column 3, line 20).

Claims 12-14 are rejected under both 35 U.S.C. 102(a) and 35 U.S.C. 102(e)(2) as being anticipated by U.S. Patent No. 5,933,598 to Scales et al., hereinafter Scales.

As per claim 12, Scales teaches a new method of processing work items in a data processing system, comprising:

effectively providing an interrupt-based mechanism for processing work items, when the system utilization is low with respect to work items (column 13, lines 60-65); and,

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effectively providing a polling-based mechanism for processing work items, when system utilization is relatively high with respect to work items (column 13, line 45 to column 14, line 13).

With regards to claim 13, Scales teaches wherein work item are received in accordance with at least one device driver associated with a host system (column 3, lines 3-30, i.e. workstations sharing resources in a shared environment, “programs executing on any of the workstations”).

Regarding claim 14, Scales teaches wherein the data processing system comprises a storage controller (column 3, lines 6-23, column 4, lines 28-58).

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re*

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Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 12-14 are rejected on the ground of nonstatutory double patenting over claims 1-15 of U. S. Patent No. 5,414,858 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows:

Claim 12 of the instant application a method of processing work items in a data processing system, comprising:

effectively providing an interrupt-based mechanism for processing work items, when the system utilization is low with respect to work items; and,

effectively providing a polling-based mechanism for processing work items, when system utilization is relatively high with respect to work items.



Claims 1, 7, and 12 disclose a method for managing service requests from a group of peripherals connected to a data processor, comprising the steps of:

operating the system in a first mode of servicing the group of peripherals responsive to interrupt type service requests generated by one or more peripherals of the group;

operating the system in a second mode of servicing the group of peripherals involving a polling of one or more peripherals of the group for service requests; and

transitioning between the first mode of servicing the group of peripherals and the second mode of peripherals responsive to changes in the time related rate at which service requests are generated by the group of peripherals.

Claims 2, 8, and 13 teach wherein the system transitions from the first mode [interrupts] to the second mode [polling] upon an increase in the rate of service requests [system utilization is high].

Claims 3, 9, and 14 disclose wherein the system operates in the first mode [interrupts] during low rates of service requests [system utilization is low].

Furthermore, there is no apparent reason why Appellant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

#### **(10) Response to Argument**

In response to the Appellant's arguments regarding claims 1, 3, 5, 7, 9 and 10 that *Hoffman* does not disclose the speculative scheduling of a further task for processing of subsequently received work items, when there are no additional work items for processing, the

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Examiner disagrees. Polling is the process of determining the status of devices so that the active program can process the events generated by each device. In other words, each device is allocated a time segment to schedule anything that requires processing, thereby making polling a speculatively scheduling processing system as opposed to an event-driven processing system, such as an interrupt processing system. *Hoffman* discloses switching to the polling system upon receiving an interrupt, and scheduling work items speculatively while the interrupt is processed. *Hoffman* discloses in figure 4 of speculatively scheduling the work items during a certain time frame, regardless of how many work items are to be processed. Therefore, *Hoffman* discloses speculative scheduling work items during polling whether there are no additional work items or several work items that need to be processed since the system does not switch back to the interrupt driven system until a certain amount of time has elapsed.

Therefore, *Hoffman* teaches the speculative scheduling of a further task for processing of subsequently received work items, when there are no additional work items for processing and the rejection should be maintained.

In response to the Appellant's arguments regarding claims 1, 3, 5, 7, 9 and 10 that *Hoffman* does not disclose the processing of one or more received work items when the speculatively scheduled task is executed or the speculative scheduling of additional further task for processing of subsequently received work items after processing the received work items, the Examiner disagrees. Figure 4 of *Hoffman* discloses the speculative scheduling system, in particular the processing of one or more received work items when the speculatively scheduled task is executed in figure 4 that a device is serviced. *Hoffman* discloses speculatively scheduling tasks for processing after the work items have been executed again in figure 4 by

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showing the loop that continually polls devices and executes the services required by those devices.

Since *Hoffman* teaches the processing of one or more received work items when the speculatively scheduled task is executed and the speculative scheduling of additional further task for processing of subsequently received work items after processing the received work items, the rejection is proper and should be sustained.

In response to the Appellant's argument regarding claims 12-14 that *Scales* does not disclose an interrupt-based mechanism and a polling-based mechanism, the Examiner disagrees. The Appellant is reminded that patents are relevant as prior art for all they contain, and that non-preferred and alternative embodiments constitute prior art. See MPEP § 2123; see also *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). Claim 12 requires a method of processing work items in a data processing system comprising, effectively providing an interrupt-based mechanism for processing work items, when system utilization is low with respect to work items, and effectively providing a polling-based mechanism for processing work items, when system utilization is relatively high with respect to work items. *Scales* teaches a method for processing work items (column 13, lines 45-50, i.e. process the messages) in a data processing system comprising, effectively providing an interrupt-based mechanism for processing work items (column 13, lines 60-65, i.e. messages could be serviced using an interrupt mechanism), when system utilization is low with respect to work items (column 13, lines 60-65, i.e. interrupts usually take longer to process and therefore would be used when system utilization is low), and effectively providing a polling-based mechanism for processing work items (column 13, lines 45-59, i.e. a polling mechanism is used to process the messages), when system utilization is

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relatively high with respect to work items (column 13, lines 51-59, i.e. polling can be down on a more frequent basis and therefore is used when the system utilization is high).


Since *Scales* discloses each and every element of claim 12, the rejection is proper and should be maintained.

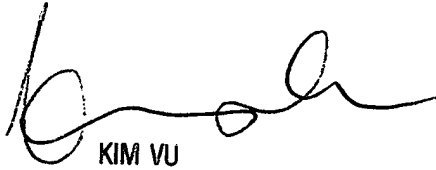
**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.


For the above reasons, it is believed that the rejections should be sustained.


Respectfully submitted,

Christian LaForgia   
Patent Examiner  
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